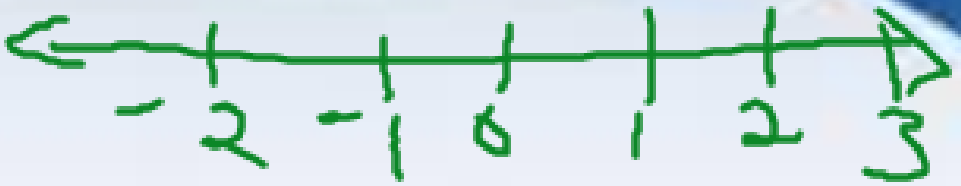
Do Now... Greatest Integer Function...

1. When f(x) = int(x), find:



f(.25)= 0

f(-1)= -1

2. When f(x) = int(2x), find:

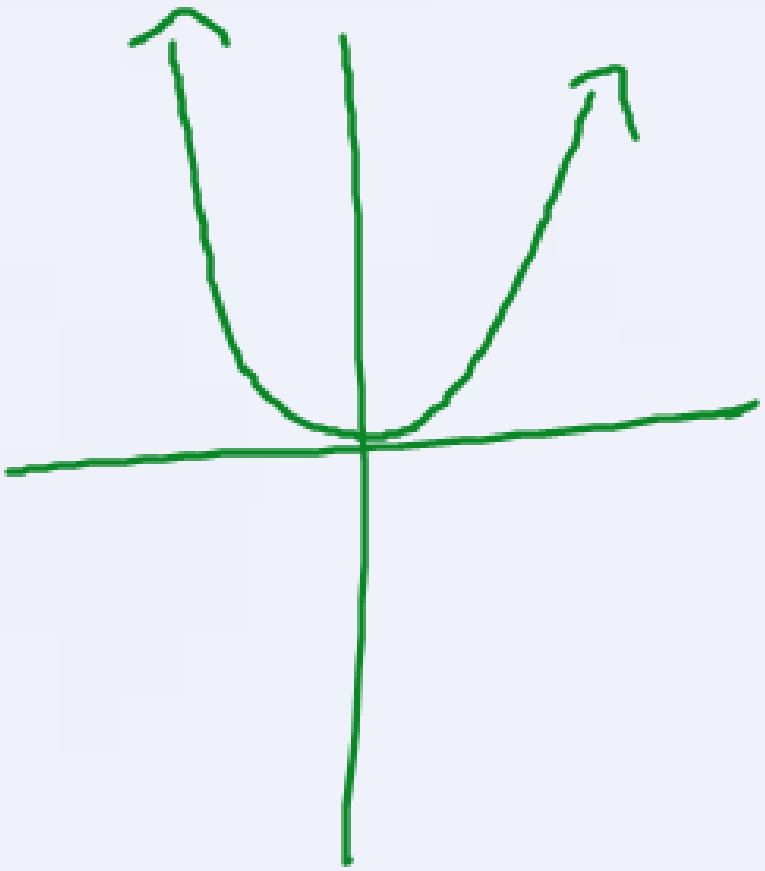
f(1.3)= 2

f(-1)= -2

Homework Questions?

p. 96 #4, 9–16, 18–24 even

#4



$(-\infty, 0)$

SECTIONS 2.4B

LIBRARY OF FUNCTIONS: PIECEWISE-DEFINED FUNCTIONS

Quiz 2.3-2.4 Wednesday.

homework

P.96
#5, 25, 26, 31, 34

OBJECTIVE

IDENTIFYING EVEN AND ODD FUNCTIONS ALGEBRAICALLY.

A function f is EVEN if, for every number x in its domain, the number -x is also in the domain.

$$f(-x) = f(x)$$

For an EVEN function, for every point (x,y) on the graph, the point (-x,y) is also on the graph.

A function f is ODD if, for every number x in its domain, the number -x is also in the domain and

$$f(-x) = -f(x)$$

For an ODD function, for every point (x,y) on the graph, the point (-x, -y) is also on the graph.

Example...

Identifying Even & Odd Functions Algebraically

(a) $f(x) = x^2 - 5$

$f(-x) = (-x)^2 - 5 = x^2 - 5$ even

(b) $g(x) = x^3 - 1$

$g(-x) = (-x)^3 - 1 = -x^3 - 1$ neither

$-(x^3 - 1) = -x^3 + 1$

(c) $h(x) = 5x^3 - x$

$h(-x) = 5(-x)^3 - (-x) = -5x^3 + x$

$-(5x^3 - x) = -5x^3 + x$ odd

Try on your own...

Identifying Even & Odd Functions Algebraically

(a) $f(x) = 2x^2 - 3$

$2(-x)^2 - 3 = 2x^2 - 3$ even

(b) $g(x) = -3x^3 + 2x$

$-3(-x)^3 + 2(-x) = 3x^3 - 2x$ odd

$-(-3x^3 + 2x) = 3x^3 - 2x$

(c) $h(x) = 10x^3 - 8$

$10(-x)^3 - 8 = -10x^3 - 8$

$-(10x^3 - 8) = -10x^3 + 8$ neither

OBJECTIVE 2

GRAPHING PIECEWISE DEFINED FUNCTIONS

Example...

Graphing Piecewise Defined Functions...

When a graph is defined by more than one equation, they are called ***piecewise-defined functions***.

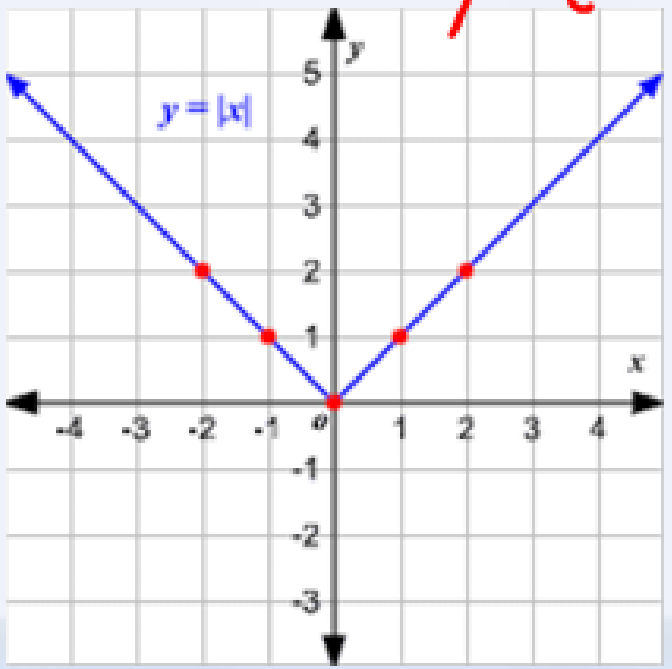
$f(x) = -x$

$f(-2) = -(-2)$

f(x) = |x| is actually defined by two equations:
f(x)=x if x≥0 & f(x)= -x if x<0

For convenience we combine to two.

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0 \\ x & \text{if } x < 0 \end{cases}$$

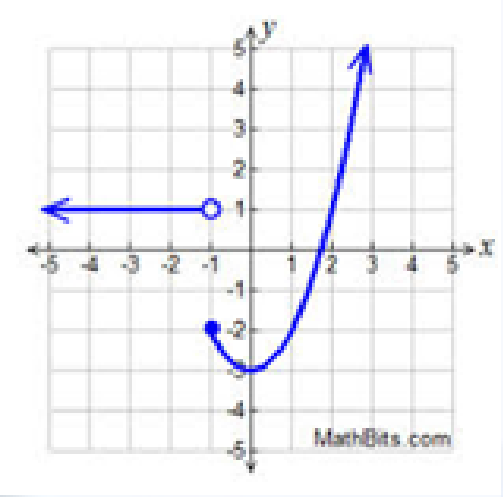


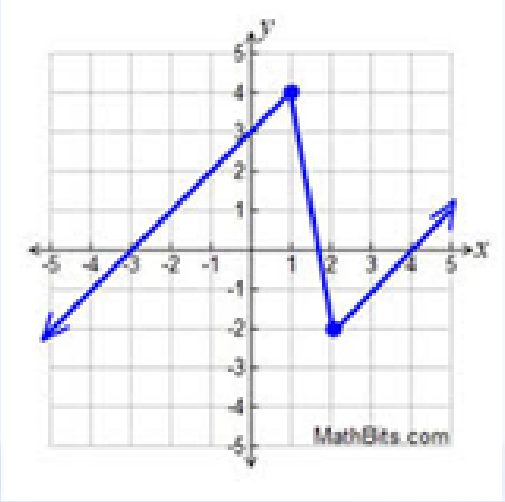
Example...

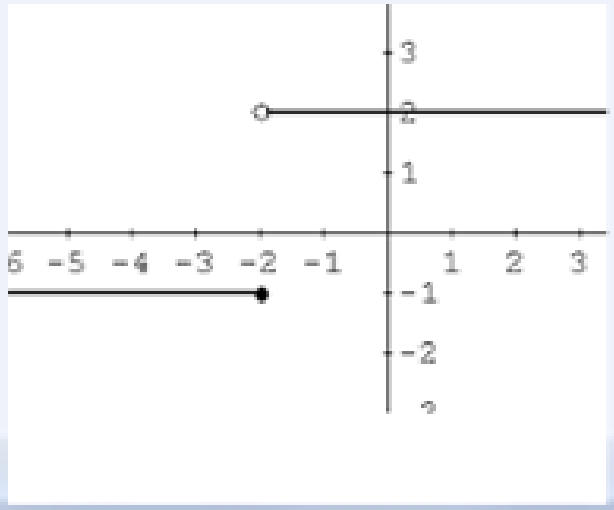
Graphing Piecewise Defined Functions...

A function is said to be **continuous** if its graph has no gaps or holes and can be drawn without lifting the pen from the paper.

A function is **discontinuous** if its graph has gaps or holes and ***cannot*** be drawn without lifting the pen from the paper.







Example...

Graphing Piecewise Defined Functions...

The function f is defined as $f(x) = \begin{cases} -x + 1 & \text{if } -3 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$

(a) Find f(0), f(1), & f(2)

$f(0) = -x + 1$

$= -(0) + 1$

$= 0 + 1$

$f(0) = 1$

$f(1) = 2$

$f(2) = x^2$

$= (2)^2$

$f(2) = 4$

Example...

Graphing Piecewise Defined Functions...

The function f is defined as

$$f(x) = \begin{cases} -x + 1 & \text{if } -3 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$$

(b) Determine the domain of f

$x \le -3$

$-3 < x < 1$

$x = 1$

$x > 1$

$[-3, \infty)$

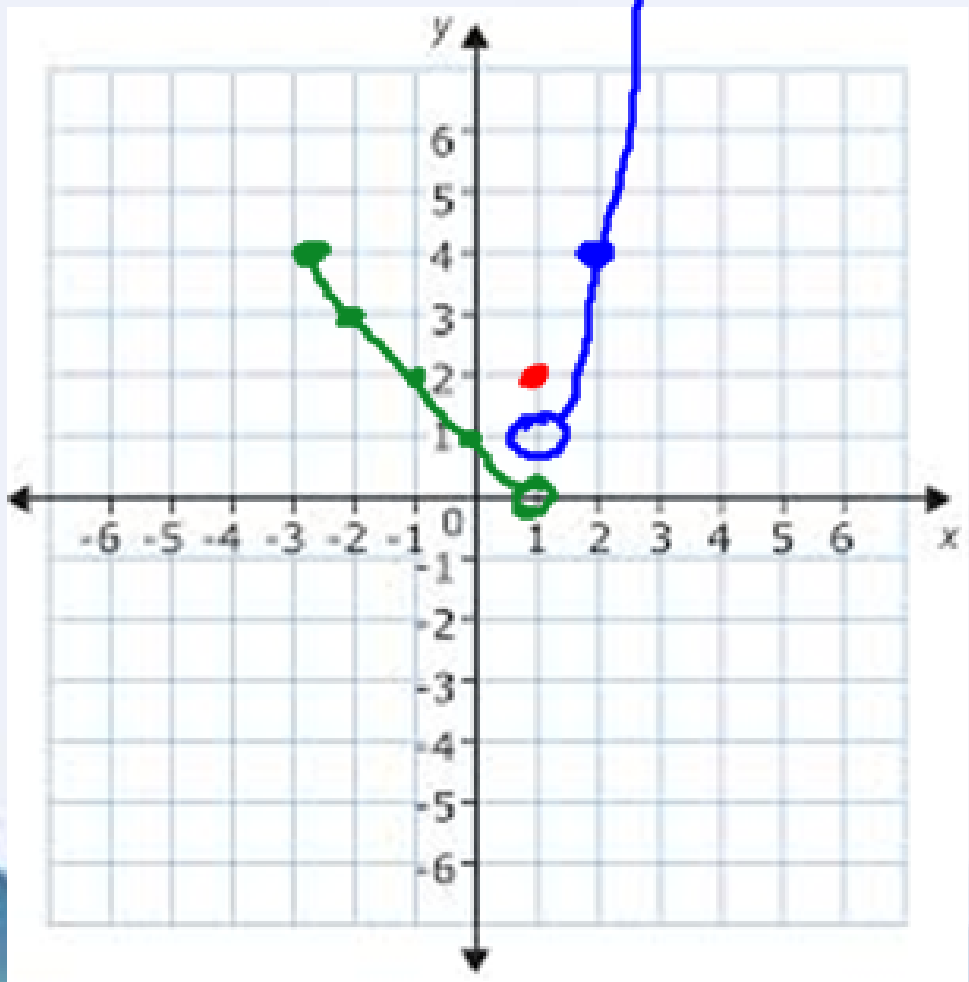
Graphing Piecewise Defined Functions...

Example...

The function f is defined as

$$f(x) = \begin{cases} -x + 1 & \text{if } -3 \le x < 1 \\ 2 & \text{if } x = 1 \\ x^2 & \text{if } x > 1 \end{cases}$$

(c) Graph f.



(d) Use the graph the find the range of f

$(0, \infty)$

(e) Is f continuous in its domain?

No.

Quiz 2.3-2.4 Wednesday.

homework

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#5, 25, 26, 31, 34